PUBLICATION 0300164-01 REV. A

GE FANUC SNP
COMMUNICATIONS REFERENCE

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ACCEPTABLE: Wrap the device in some type of antistatic material. Antistatic plastic material can be identified by its pink color, and can be obtained in sheet or bag form.

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Static, Inc.	(800-782-8424)	8000 Series bag
Charles Water	(617-964-8370)	CP-303 bag

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Contents

Preface 1

Who Should Use this Reference 1

Related Documents 2

Chapter 1: Cabling and Communication Ports ... 3

Uploading and Downloading Application Programs 4

Connecting to the GE Fanuc Series PLC 8

Outputting Printer Forms (SOI-260 only) 9

Accepting ASCII Input (SOI-260 only) 10

Chapter 2: Programming 11

Supported GE Fanuc PLC Registers 12

Supported Data Formats 13

Data Display and Entry Screen Parameters 19

Multiple Entry 24

GE Fanuc-Specific Configuration Parameters 27

Chapter 3: Troubleshooting 28

Chapter 4: Terminal Mode 30

"Arcade" Entry of ASCII Characters 30

Direct ASCII Code Entry (SOI-260 only) 31

CHAPTER 5: SPECIAL OPERATIONS (P-A/D) 32
Point-Access/Display on the SOI-120 32
Point-Access/Display on the SOI-260 34

PREFACE

Read this preface to familiarize yourself with the rest of this Reference. This preface covers:

- who should use this guide
- related documents

This Reference covers the information needed to use an SOI-120 or -260 operator interface product with a GE Fanuc Programmable Logic Controller. The Reference contains the information you need to install, program, troubleshoot, and use your SOI.

Please read all the information in this reference before you install or use your SOI.

Who Should Use this Reference

Use this Reference if you design, install, program, or maintain a control system that uses a GE Fanuc programmable controllers which support the SNP protocol.

This reference assumes a full working knowledge of the relevant programmable controller.

You should have a basic understanding of computer products. If you do not, contact your local distributor for the proper training before using these products.

Related Documents

The following table lists related documents that may help you as you install and use these products:

Publication Number	Title
0300050	SOI-260 Operator Interface User Manual
0300051	SOI-120 Operator Inferface User Manual
0300054	SOI-SPS Programming Software Manual
0300063	Upload/Download Cable For SOI-120 and SOI-260

Chapter 1: Cabling and Communication Ports

This chapter of the *GE Fanuc SNP Communications Reference* covers the cabling needed to use the SOI-120's RS-232 communications port (see Figure 1.1) and the SOI-260's communications port and optional printer port (see Figure 1.2).

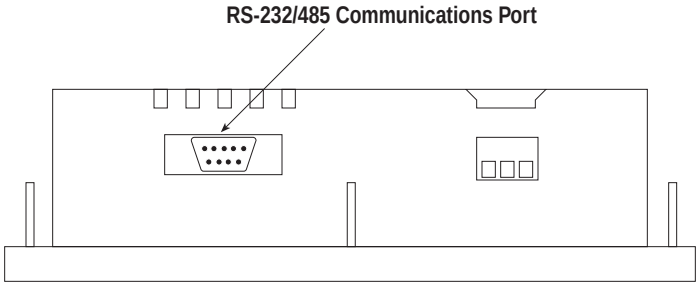


Figure 1.1 SOI-120 Communications Port.

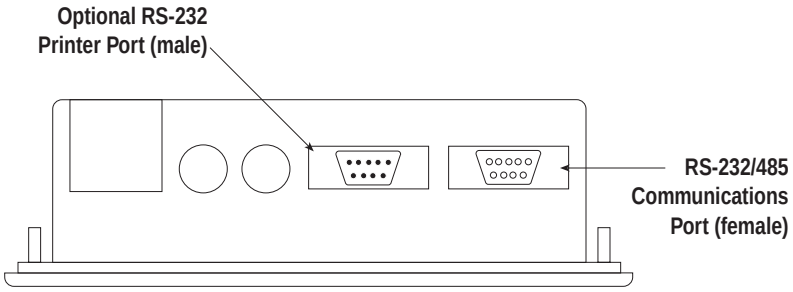


Figure 1.2 SOI-260 Communications Port and Optional Printer Port.

Use the communication ports to...

- upload or download application programs from a personal computer
- connect your SOI-120 or SOI-260 to the programmable controller

On the SOI-260, you can also use the optional RS-232 printer port to...

- output Printer Forms to a printer or other serial device, such as a large ASCII display unit
- accept data from an ASCII input device (such as a bar code scanner)

Uploading and Downloading Application Programs

On the SOI-260, you may use either the communications port or the optional printer port to upload or download application programs from a personal computer.

On the SOI-120, you must use the communications port.

The following subsections describe the cabling needed.

Upload/Download via Communications Port (RS-232 communications selected)

Figures 1.3 and 1.4 show the cable pin connections (9-pin to 25-pin and 9-pin to 9-pin, respectively) when using the SOI-120's or SOI-260's communications port (RS-232 selected) to upload or download applications from a personal computer. The figures indicate the required connections when building your own cable.

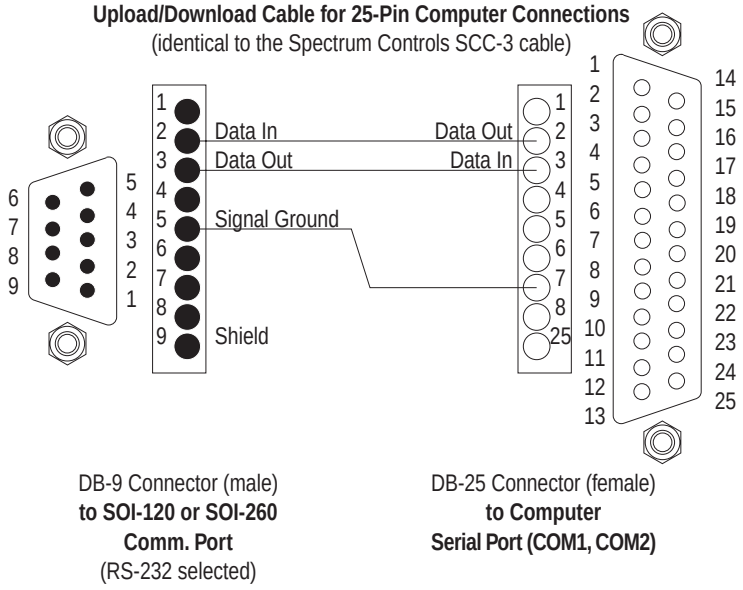


Figure 1.3 Upload/Download cable for 25-pin computer connections.

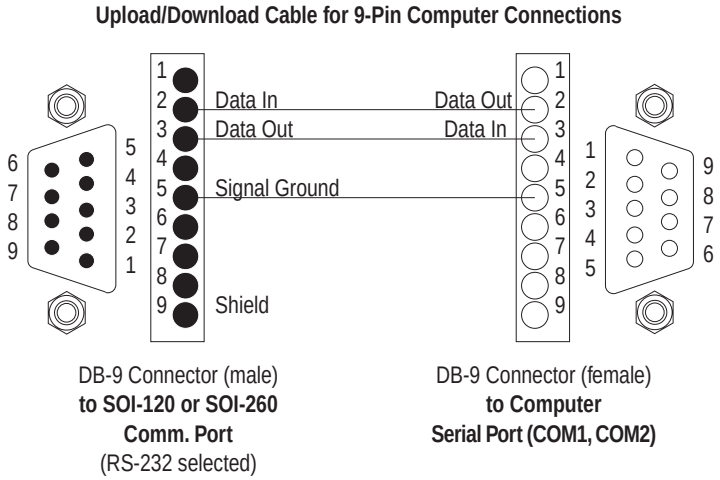


Figure 1.4 Upload/Download cable for 9-pin computer connections.

Upload/Download via Optional Printer Port (SOI-260 only)

Figures 1.5 and 1.6 show the cable pin connections (9-pin to 25-pin and 9-pin to 9-pin, respectively) when using the SOI-260's optional printer port to upload or download applications from a personal computer. The figures indicate the required connections when building your own cable.

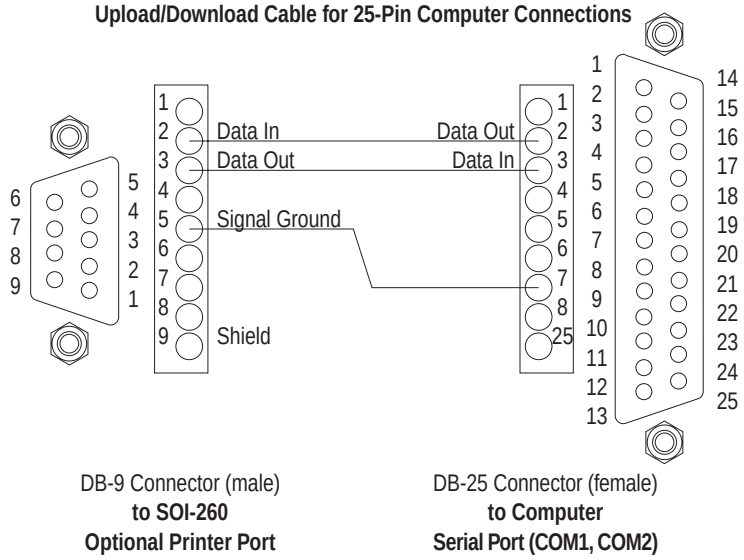


Figure 1.5 Upload/Download cable for 25-pin computer connections.

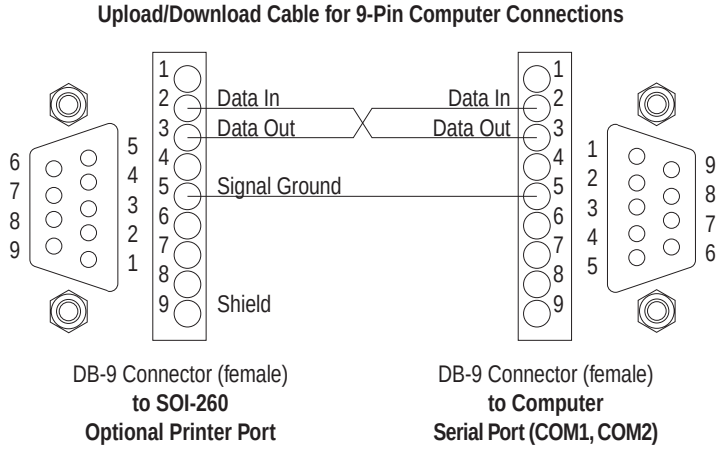


Figure 1.6 Upload/Download cable for 9-pin computer connections.

Upload/Download with the Spectrum Controls SCC-3 Cable

If you don't want to build your own cable, Spectrum Controls offers the SCC-3 cable for uploading and downloading application programs. The pin connections for the SCC-3 cable are identical to those shown in Figure 1.2. You may use the SCC-3 cable to connect the SOI-120's communications port or SOI-260's communications port or optional printer port to a personal computer. If your computer has a 9-pin communications port, you need a 25-to-9 pin adapter, shown in Figure 1.7. If you want to use the SOI-260's optional printer port for uploading and downloading applications, you also need a 9-pin female adapter, shown in Figure 1.8.

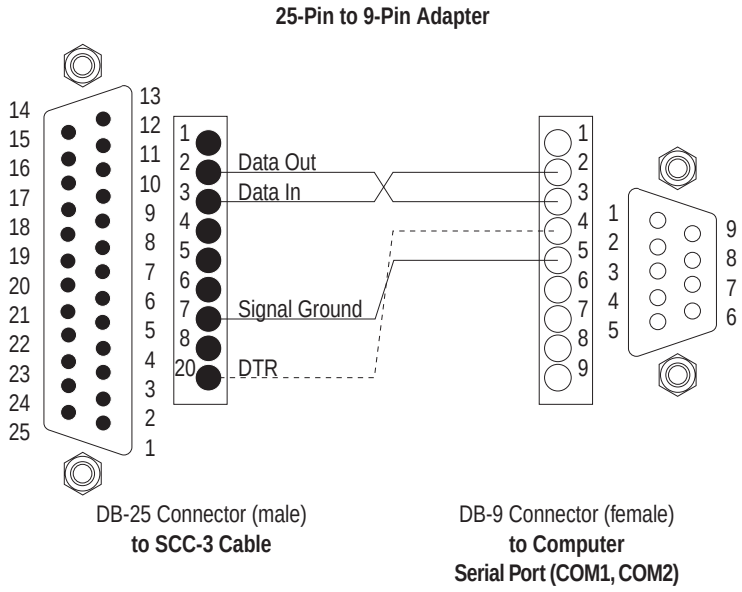


Figure 1.7 25-pin to 9-pin adapter.

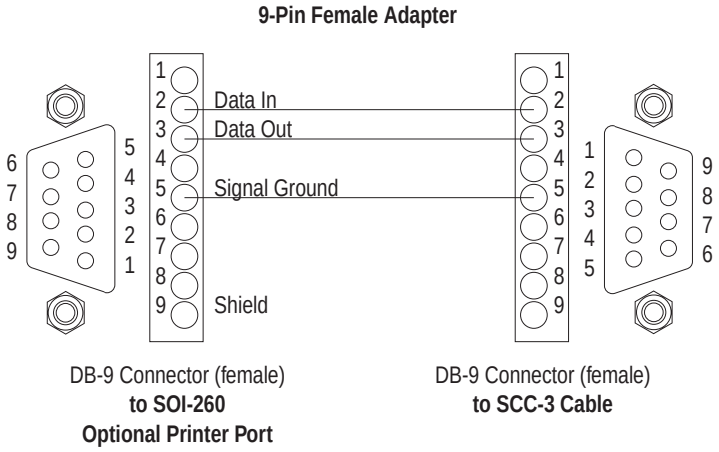


Figure 1.8 9-pin female adapter.

Connecting to the GE Fanuc PLC

The SOI may be connected to the GE Fanuc PLC via the programming port or one of the SNP capable ports in an optional GE Fanuc Communications Coprocessor Module as shown in Figures 1.9 and 1.10. (Contact Spectrum Controls for information on interfacing to the CMM using Modbus protocol.)

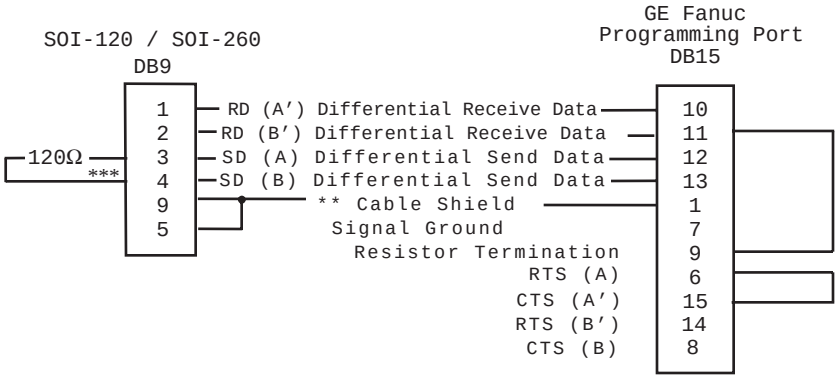


Figure 1.9 Connecting to the PLC Programming Port 2

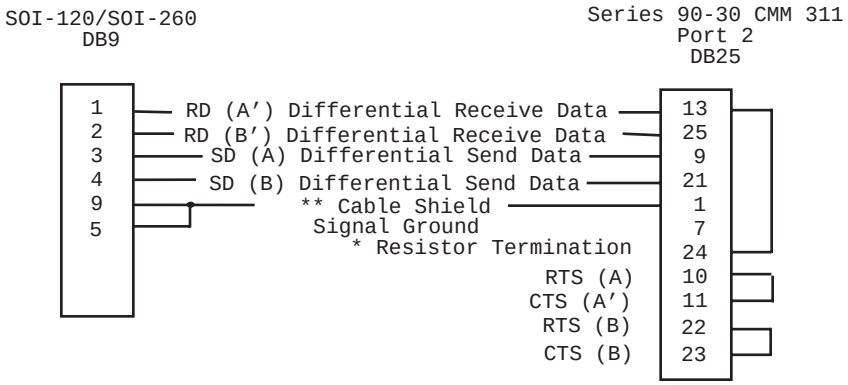


Figure 1.10 Connecting to the CMM Port 2 (RS485/422)

*** Series 90-30 Resistor Termination:**

The PLC communnication port Receive Data differential pair must be terminated as indiated if the PLC is either the first or last drop on the SNP bus. This is always the case in a point-to-point configuration. However, PLCs may be connected as multiple drops. Do not connect the termination resistor if the PLC is not the first or last drop on the SNP bus.

** **Shield Ground:**

The shield must be grounded at the first drop on the SNP bus. If the SOI is the first drop on the bus, connect the SOI communication port pins 5 and 9. If the PLC is the first drop on the bus, connect pins 1 and 7 on the PLC port. **Do not connect the shield to gorund on more than one unit (SOI or PLC) on the SNP bus.**

*** **SOI Resistor Termination:**

The SOI communication port Receive Data differential pair must be terminated as indicated if the SOI is either the first or last drop on the SNP bus. This is always the case in a point-to-point configuration. However, multiple PLCs may be connected to the SNP bus. Do not connect the termination resistor if the SOI is not the first or last drop on the SNP bus. The SOI will only connect to and communicate with one PLC regardless of how many are attached to the SNP bus.

Outputting Printer Forms (SOI-260 only)

You can use the SOI-260's optional printer port to output Printer Forms to a printer or other serial device, such as a large ASCII display unit. Printer forms are created in the SOI-SPS programming software and may include production reports, alarm messages, instructional text, etc.

Figure 1.11 illustrates the cabling needed.

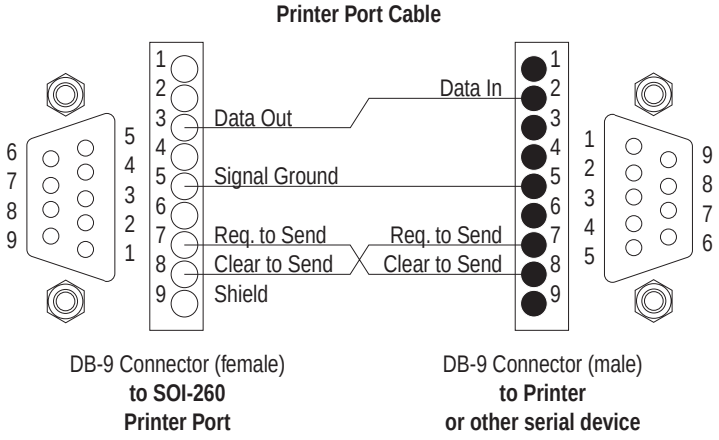


Figure 1.11 Printer port cable.

Accepting ASCII Input (SOI-260 only)

The SOI-260's optional RS-232 printer port may also be used to accept ASCII data from a variety of devices, including bar code scanners. When using a scanner to read a bar code, the ASCII data is entered directly from the device into a standard data entry screen (created using the SOI-SPS programming software) on the SOI-260.

Note: ***If the SOI-260 recieves an odd number of characters from the scanner, the SOI-260 adds a Null character to create an even byte count. This facilitates word writes to the controller.***

If keypad entry is enabled, the operator may also use the 0–9 and decimal point keys to enter numeric data into the data entry field. The SOI-260 writes data to the controller when any of the following occurs:

- the SOI-260 receives an ASCII carriage return character
- the operator presses the SOI-260's RETURN key
- the SOI-260 receives the maximum number of characters

For example, an operator can manually enter 2 characters and then scan a bar code containing 8 characters, with the last character being an ASCII carriage return. The SOI-260 then writes all 10 characters to the controller and moves to the next entry field.

Chapter 2: Programming

This chapter of the *GE Fanuc SNP Communications Reference* covers the following:

- supported GE Fanuc PLC registers
- supported SOI-120 and SOI-260 screen types and parameters
- GE Fanuc-specific configuration parameters

Supported GE Fanuc PLC Registers

The SOI-120 and SOI-260 support the following registers:

Type	Name	Size	[1]Access	[1]Range
R	Registers	16 bit word	Read/Write	1-16,384
AI	Analog Inputs	16 bit word	Read/Write	1-8,192
AQ	Analog Outputs	16 bit word	Read/Write	1-8,192
I	Discrete Inputs	bit byte	Read/Write	1-12,288 1-1,536
Q	Discrete Outputs	bit byte	Read/Write	1-12,288 1-1,536
T	Discrete Temporaries	bit byte	Read/Write	1-256 1-32
M	Discrete Internals	bit byte	Read/Write	1-12,288 1-1,536
SA	Discretes	bit byte	Read/Write	1-128 1-16
SB	Discretes	bit byte	Read/Write	1-128 1-16
SC	Discretes	bit byte	Read/Write	1-128 1-16
S	Discretes	bit byte	Read/Write	1-128 1-16
G	Genius Global Data	bit byte	Read/Write	1-7,680 1-960

[1] Your PLC may not support all the access methods and addresses listed here. Attempting to acheive access not allowed by the PLC or to an address not supported by the PLC will result in a communications fault while using the SOI.

Supported Data Formats

The data format selected for a particular programmable controller memory location must reflect the correct format for the data actually stored in that location. This is the only way you can ensure that correct, consistent information is displayed on the SOI-120 or SOI-260.

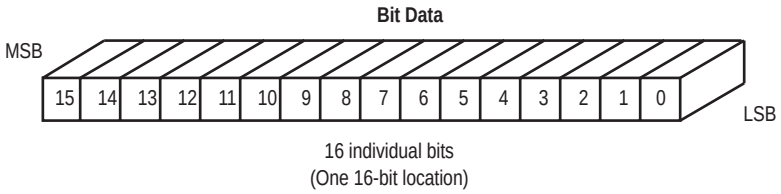
For example, selecting a 16-Bit Hex format for one location will display data in one way. Selecting a 16-Bit Signed Integer format for the same location will display the data in another way. It is important to understand each data format and its characteristics.

The following table lists all supported data formats and the ranges applicable to each:

Data Format	Range	Scalable to Engineering Units
Bit	0, 1	No
16-bit signed integer	-32,768 to +32,767	Yes
16-bit unsigned integer	0 to +65,535	Yes
16-bit BCD	0 to 9,999	Yes
16-bit hexadecimal	0 to FFFF	No
32-bit unsigned integer	0 to +4,294,967,295	No
32-bit BCD	0 to +99,999,999	No
32-bit hexadecimal	0 to FFFF FFFF	No
ASCII display	0 to 20 characters	No
ASCII input (SOI-260 only)	0 to 32 characters	No

The supported data formats are described below.

Bit

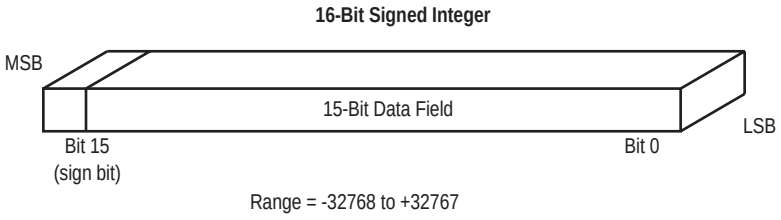


The programmable controller stores a binary (0 or 1) status for a bit location. The SOI will read a programmable controller bit location and determine whether the operational status of the bit is ON (1) or OFF (0). You can customize the text to be displayed on the screen of the SOI-120 or SOI-260 for either state of a specified bit. This text can be up to twenty characters.

For example, the OFF (0) state of a bit might display “Pump is OFF,” and the ON (1) state “Pump is ON.” SOI-SPS allocates enough screen characters for the longest of the two text strings. In this example, 12 characters would be allocated to display “Pump is OFF.”

*Note: **The fewer characters used, the less memory is required. In the example above, displaying "OFF" (given the appropriate context) conveys the same information in 3 characters as "Pump is OFF" does with 11 characters.***

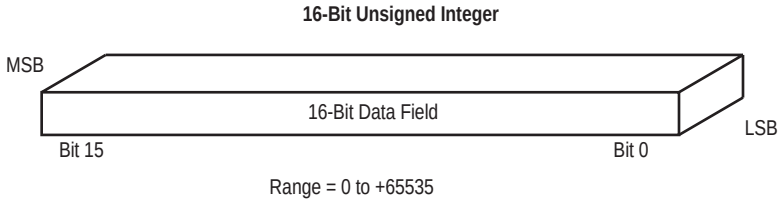
16-Bit Signed Integer



This data type displays a 16-bit register as a signed Integer (two’s complement) value. The 16th bit of the register is the sign bit and is set (1) for a negative and cleared (0) for a positive number. The 16-bit signed integer values have a range of -32768 to +32767.

*Note: **This data format may be scaled within the SOI-120 or SOI-260 to different engineering units.***

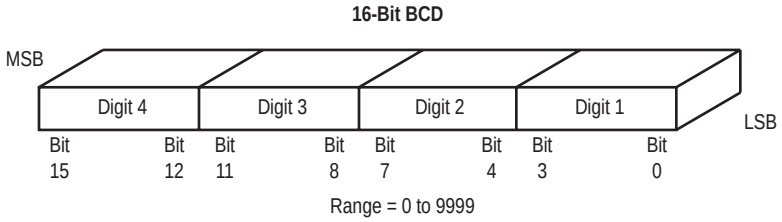
16-Bit Unsigned Integer



This data format displays a 16-bit register as an Unsigned Integer value. It represents a positive number by using the 16th bit as a data bit rather than a sign bit. The 16-bit Unsigned Integer values have a range of 0 to +65,535.

Note: This data format may also be scaled to different engineering units within the SOI-120 or SOI-260.

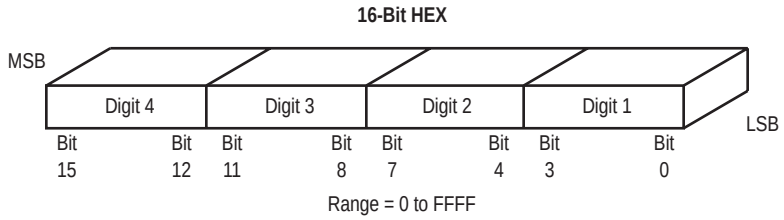
16-Bit Binary Coded Decimal



This data type displays a 16-bit register location as a 4-digit Binary Coded Decimal value. The range for the 16 bit BCD selection is 0 to +9999.

Note: This data format may also be scaled to different engineering units within the SOI-120 or SOI-260.

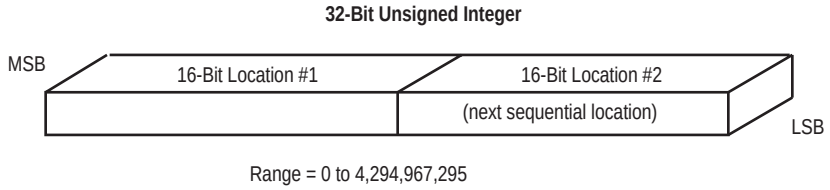
16-Bit Hexadecimal



This data type displays a 16-bit register location as a 4-digit hexadecimal value. The range for the 16-bit Hex format is 0 to +FFFF. The Hexadecimal number system is defined as a base of 16 (0-9 and the characters A, B, C, D, E, F).

Note: This data format may not be scaled to different engineering units within the SOI-120 or SOI-260. It is used for display-only (non-entry) operations.

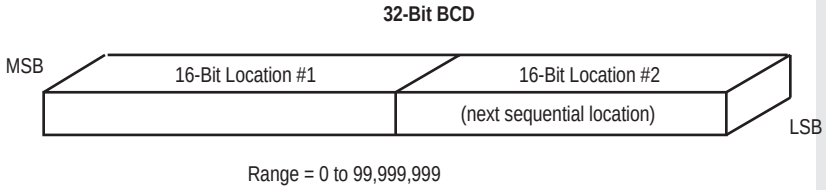
32-Bit Unsigned Integer



This data format displays data located in two consecutive 16-bit register locations as a 32-bit Unsigned Integer. It uses a memory register plus the next higher register to form the 32-bit location. The High data value is stored in the first register and the Low data value is stored in the next sequential register location. The range for the 32-bit unsigned Integer value is 0 to +4,294,967,295.

Note: This data format may not be scaled to different engineering units within the SOI-120 or SOI-260.

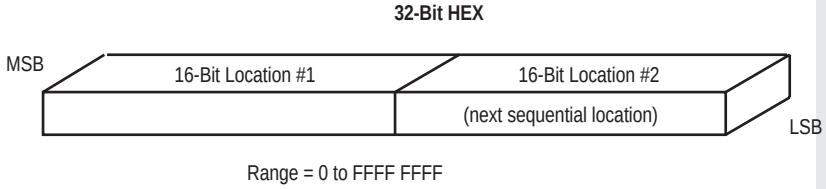
32-Bit Binary Coded Decimal



This data type displays two consecutive 16-bit register locations as a 32-bit BCD value. It uses a memory register plus the next higher register to form the 32 bit location. The range for the 32 bit BCD value is 0 to +99,999,999.

Note: This data format may not be scaled to different engineering units within the SOI-120 or SOI-260.

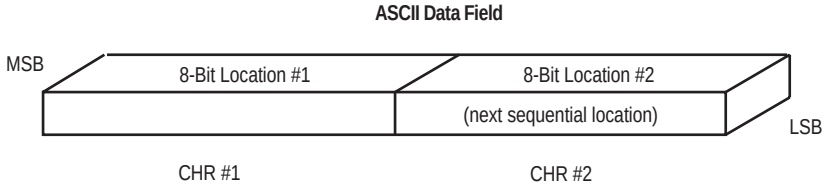
32-Bit Hexadecimal



This data type displays two consecutive 16-bit register locations as a 32-bit Hex value. It uses a memory register plus the next higher register to form the 32-bit location. The range for the 32-bit HEX value is 0 to FFFF FFFF.

Note: This data format may not be scaled to different engineering units within the SOI-120 or SOI-260. This data format is used for display-only (non-entry) operations.

ASCII



Each 16-bit location may contain two ASCII characters (1 byte each). By default, the most significant byte of the base address stores the first character, the least significant byte stores the second character, the first byte of the next sequential location stores the third character, and so on. The data held in this range of address locations is expected to be in ASCII data format.

Note: The ASCII data format is very useful for programmable controller applications reading ASCII data from bar code readers or data collection terminals.

Note: This data format may not be scaled to different engineering units within the SOI-120 or SOI-260.

Data Display and Entry Screen Parameters

When programming Data Display and Data Entry fields and positioning them on an SOI-120 or SOI-260 screen, each field must be defined according to its programmable controller memory location (address), data format, and other data parameters specific to the data format selected.

You are prompted for the register definitions at the Control Window. Each register definition is somewhat different, depending on the data format selected and whether the data field is a Data Display or Data Entry field.

The tables in the following two subsections list the applicable data formats and the Control Window prompts associated with each.

Data Display Screens

The data format selections available for Data Display screens are listed below and their parameters described.

Display Screen Parameter for: Bit Data	Description
Register Number	The programmable controller data location operand and address.
Bit Number	The Bit number if the register number designates a multiple bit location (a 16 bit data address, for example).
Text when Bit is OFF (0)	The 20 character text description to be displayed when the bit is in an OFF (0) state
Text when Bit is ON (1)	The 20 character text description to be displayed when the bit is in an ON (1) state.

Display Screen Parameter for: 16-Bit Unsigned Integer, 16-Bit Signed Integer & 16-Bit BCD Data	Description
Register Number	The programmable controller data location operand and address.
Digits Right of Decimal	The number of digits to be placed to the right of the decimal.
Digits Left of Decimal	The number of digits to be placed to the left of the decimal.
Leave Place for Sign (Y or N)	Leave a one character place for the polarity sign (+ or -) when the data is displayed.
Show Leading Zeros (Y or N)	Display any zeros to the left of the data.
Minimum Register Value	The minimum data value of the programmable controller location.
Maximum Register Value	The maximum data value of the programmable controller location.
Minimum Displayed Value	The minimum data value to be displayed. This value is displayed when the data in the programmable controller location is equal to the minimum register value. See Maximum Displayed Value, below, for a description of scaling.
Maximum Displayed Value	The maximum data value to be displayed. This value is displayed when the data in the programmable controller location is equal to the maximum register value. The range defined by the Minimum Displayed Value and the Maximum Displayed Value is proportionally scaled to the range of the minimum and maximum register values. If both ranges are equal then the scaling ratio is 1:1.
Minimum Bar Value	(Bar Graph Only) The minimum value of data to be displayed in the Bar Graph. This value must be greater or equal to the Minimum Displayed Value.
Maximum Bar Value	(Bar Graph Only) The maximum value of data to be displayed in the Bar Graph. This value must be less than or equal to the Maximum Displayed Value. The Minimum and Maximum bar graph values may be used to display a particular range or window of an overall range (Minimum and Maximum Displayed Values).

Display Screen Parameter for: 32-Bit Unsigned Integer & 32-Bit BCD Data	Description
Register Number	The programmable controller data location operand and address.
Digits Right of Decimal	The number of digits to be placed to the right of the decimal.
Digits Left of Decimal	The number of digits to be placed to the left of the decimal.
Show Leading Zeros (Y or N)	Display any zeros to the left of the data.

Note: For the 32-Bit BCD selections, scaling of data is not supported. The selected register number and the next higher sequential register number identify the locations defining the 32 bit data value.

Display Screen Parameter for: 16 -Bit HEX, 32-Bit HEX Data	Description
Register Number	The programmable controller data location operand and address.

Display Screen Parameter for: ASCII Data:	Description
Register Number	The programmable controller data location operand and address.
Character Count	The number of characters (2 characters for each 16 bit data location) to be displayed, up to a maximum of 20 characters. The initial byte of the location identified by the register number is displayed first, then the second byte, the first byte of the next higher sequential location, and so on. To display 20 characters, a sequential block of ten 16 bit locations is read by the SOI.

Data Entry Screens

The data format selections available for Data Entry screens are listed below and their parameters described.

Entry Screen Parameter for: Bit Data	Description
Register Number	The programmable controller data location operand and address.
Bit Number	The Bit number if the register number designates a multiple bit location (a 16 bit data address, for example). This selection is irrelevant if the register number refers to a Bit type address.
Input Data by Pressing '1'/'0' or 'Y'/'N' ? (Enter 1 or Y)	This parameter determines whether the operator will enter 1 or Y to set the defined bit location. If 1 is entered, 0 will clear the bit location. If Y is entered, N will clear the bit location.
Default Value ? Z = No Default (Enter 1,0,Y,N,Z)	This parameter defines the default value that is displayed at the data entry position of the SOI display. If a default value of Y is entered, a Y is displayed, and the operator is only required to press ENTER to set the bit location. An entry of Z defines no default value. If there is no default value programmed, and the operator presses the ENTER, no data is sent to the programmable controller.

Entry Screen Parameter for: 16-Bit Unsigned Integer, 16-Bit Signed Integer & 16-Bit BCD Data	Description
Register Number	The programmable controller data location operand and address.
Digits Right of Decimal	The number of digits to be placed to the right of the decimal.
Digits Left of Decimal	The number of digits to be placed to the left of the decimal.
Leave Place for Sign (Y or N)	Leave a one character place for the polarity sign (+ or -) when the data is displayed.
Minimum Register Value	The minimum data value of the programmable controller location.

Maximum Register Value	The maximum data value of the programmable controller location.
Minimum Entry Value	The minimum data value to be entered. When this value is entered the minimum register value is entered to the defined programmable controller location. See Maximum Entry Value, below, for a description of scaling.
Maximum Entry Value	The maximum data value to be entered. When this value is entered the maximum register value is entered to the defined programmable controller location. The range defined by the minimum entry value and the maximum entry value is proportionally scaled to the range of the minimum and maximum register values. If both ranges are equal then the scaling ratio is 1:1.
Low User Input Limit	The minimum entry value that an operator may enter. This value must be within the minimum and maximum entry values. If a value lower than this limit is entered the SOI will display an “Input Error” screen displaying the minimum and maximum entry limits.
High User Input Limit	The maximum entry value that an operator may enter. This value must be within the minimum and maximum entry values. If a value higher than this limit is entered the SOI will display an “Input Error” screen displaying the minimum and maximum entry limits.
Default Value	This parameter defines a default value that is displayed at the entry location of the display. An entry of Z defines no default value.

Entry Screen Parameter for: ASCII Data	**Description**
Register Number	The programmable controller data location operand and address.
Character Count	The number of characters (2 characters for each 16 bit data location) to be displayed, up to a maximum of 32 characters. The initial byte of the location identified by the register number is displayed first, then the second byte, the first byte of the next higher sequential location, and so on.

Entry Screen Parameter for: 32-Bit Unsigned Integer & 32-Bit BCD Data	Description
Register Number	The programmable controller data location operand and address.
Digits Right of Decimal	The number of digits to be placed to the right of the decimal.
Digits Left of Decimal	The number of digits to be placed to the left of the decimal.
Low User Input Limit	The minimum entry value that an operator may enter. This value must be within the range of 0 to +99,999,999. If a value lower than this is entered, the SOI will display an "Input Error" screen displaying the minimum and maximum entry limits.
High User Input Limit	The maximum entry value that an operator may enter. This value must be within the range of 0 to +99,999,999. If a value higher than this is entered, the SOI will display an "Input Error" screen displaying the minimum and maximum entry limits.
Default Value	This parameter defines a default value that is displayed at the entry location of the display. An entry of Z defines no default.

*Note: **For the 32-Bit BCD selections, scaling of data is not supported. The defined register number and the next higher sequential number locations will define the data value.***

Multiple Entry

The SOI-120 and SOI-260 with the GE Fanuc SNP communications protocol can now accept and display multiple entries per screen. The recommended limits are 4 entries/displays per screen (in any combination: for example 3 entries & 1 display or 2 entries & 2 displays). The display is "live" unless you are in the middle of an entry.

*Note: **Depending on the speed of the programmable controller, the cursor may appear to flash erratically when moving from screen to screen or between entry fields on the current screen. This flashing is consmetic only. This is a temporary condition which goes away once the screen is fully refreshed.***

The following table decribes how to use the keys with the multiple entry feature.

Key	Description
NEXT	Moves you to the next screen. Cursor will be at the first (top left) entry of each screen. If at end of a series of linked screens, pressing "NEXT" moves the cursor between entries.
PREV	Moves you up the list of linked screens. Cursor will be at the first (top left) entry of each screen. If at start of a series of linked screens, "PREV" moves you between entries.
ENTER	Allows you to send data and move to next entry within an entry screen. If no data is entered, pressing ENTER moves you from one entry field to the next.

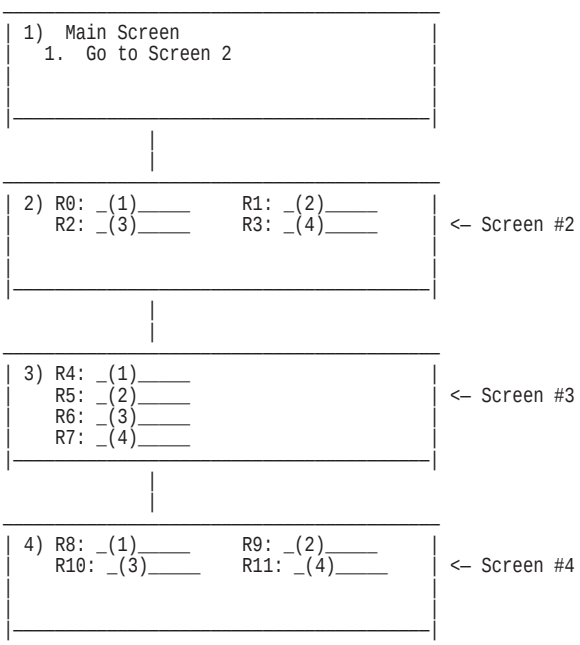
When using the function keys on the SOI-120 to jump to an entry screen with multiple entries, you must either press the "ENTER" key to go through all the entries defined, or your must press the "PREV'" or "NEXT" key, before the SOI allows you to go back to the calling screen. That is, pressing "ENTER" at the last entry, "PREV", or "NEXT" brings you back to the calling screen (assuming auto-return is specified).

The following examples show how the multiple entry feature works:

EXAMPLE A

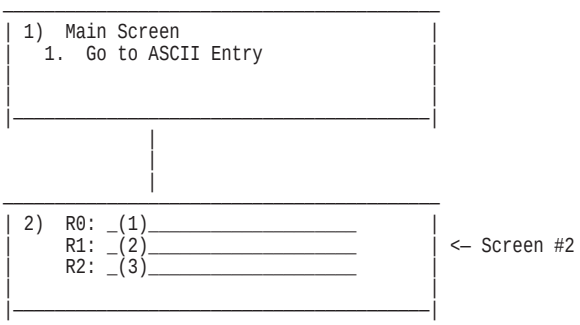
Example A has 4 screens linked one after the other. Screen 1 is the main menu screen. Screens 2–4 are entry screens. Each screen has 4 entries and 0 displays. Defaults are set to "NONE". If defaults were specified, pressing "ENTER" always sends the default value and then advances to the next entry position. The user must use the "PREV"/ "NEXT" key to move up/down a series of linked screens.

Cursor movement is defined as follows: If you press the "ENTER" key several times, the cursor moves in the following order: (1), (2), (3) and (4) then back to (1).



EXAMPLE B

Example B below show screen 2 with 3 ASCII entries of field size 10. If you scan in (using a Bar Code Scanner) 20 characters, the first ten go into register DM0 and the other 10 characters will be discarded and the cursor moves to the next entry field. Pressing "ENTER" allows you to go the the next entry field.



GE Fanuc-Specific Configuration Parameters

This section describes the GE Fanuc-specific PLC hardware parameters that the SOI-SPS programming software supports.

Note: Refer to the SOI-SPS programming software manual for complete details on programming and additional information regarding the parameters accessible from the SOI Configuration Data menu.

Select the PLC Hardware Parameters menu option from the SOI Configuration Data menu to modify the PLC Address, Communications Port Setup, or Advisor Update Rate.

PLC CPU ID: <default = blank>

The PLC CPU ID may be blank or any combination from one to six ASCII characters of the '0' - '9' or 'A' - 'F' upper case only. If blank, the SOI will assume it is in a point-to-point connection and broadcast with a NULL CPU ID. The CPU ID must match the CPU ID of the PLC with which the SOI is to connect. The PLC must be configured with the GE Fanuc PLC programming software.

Note: Do not use a blank CPU ID in a multidrop configuration. If you do, communications on all units on the bus is likely to fail.

Communications Baud Rate: <default = 19,200>

Data Bits: <default = 8>

Parity <default = odd>

The communications must match those in the PLC as configured with the GE Fanuc PLC programming software.

The default **Advisor Update Rate** is: 2.00.

Note: SPS and the SOI do not support PLC passwords. The PLC must be operating at an access level three (3) or higher with no password for the SOI to establish a connection.

CHAPTER 3: TROUBLESHOOTING

This chapter of the *GE Fanuc SNP Communications Reference* provides solutions to possible problems with the SOI-120 and SOI-260 and their use with the GE Fanuc SNP communications protocol.

Typically, any problems that occur involve communications between the SOI-120 or SOI-260 and the PLC. The communications software used to communicate with the PLC has passed critical compliance tests, usually eliminating the software as a possible source of a problem.

The only other possible sources are the cabling and the communication port parameters involved (baud rate, etc.). The communication parameters must be identical for both the SOI-120 or SOI-260 and the PLC. The cabling and the communications port parameters are always the first things to check.

Note: ***You can check the communications port parameters either from the SOI (see "Chapter 4: Special Operations (P-A/D)") or from the SOI-SPS programming software (see "Chapter 2: Programming").***

If the cabling and communications parameters are correct, put the SOI-120 or SOI-260 in Self-Test mode to rule out any non-functioning features of the SOI.

Note: ***Refer to the* SOI-260 User's Manual *for detailed information about the Self-Test Mode.***

The following screens appear on the SOI to indicate a problem:

Establishing Comm

Attempting to communicate to PLC. Action: None. Normal display when initiating communications with the PLC.

*** <PLC ERR MJ/MN:0000>**

Communications not established with the PLC. This is displayed after attempting to establish communications with the PLC and fails after three (3) tries). (Refer to footnote for further details.) Action: Check cabling and communications parameters to verify that the PLC matches those of the SOI-200. Perform the Self-Test function if the Comm port is suspected.

*** COMM ERROR MJ/MN:0000**
Press Any Key

Communication with the PLC was lost after three (3) attempts. Action: Check SOI-to-PLC cabling. Check PLC operating conditions.

* = Note: The SOI reports the Major/Minor errors codes as received from the GE SNP PLC. If the major and minor error codes are non-zero the error code is defined by the GE SNP. Otherwise, if zero, the SOI did not detect a response from the PLC. The PLC Major and Minor error codes are displayed as follows: 00 (Major) 00 (Minor)

Major Error Codes:

00h	No response detected from the PLC. Check cabling and comm settings.
02h	Insufficient Privilege to access PLC. Check minor error code.
05h	The PLC detected a Service Request Error. Check minor error code.
Any other	Check cabling and comm settings before calling your service rep.

Minor Error Codes:

FEh	No privilege for the attempted operation. The SOi requires access level 3 or higher
F5h	Invalid password. The SOI does not support passwords.
F9h	Task address out of range. Verify register address is valid for your CPU
Any other	Check cabling and comm settings before calling your service rep.

Chapter 4: Terminal Mode

Read this chapter of the *GE Fanuc SNP Communications Reference* to become familiar with the SOI-120's and SOI-260's Terminal Mode of operation. This chapter covers:

- "arcade" entry of ASCII characters
- direct ASCII code entry (SOI-260 only)

In terminal mode, the SOI operates as a simple terminal: each key pressed on the SOI's keypad causes a character to be sent out the SOI's communications port. Displayable ASCII characters sent into its communications port are displayed on the SOI's screen.

"Arcade" Entry of ASCII Characters

The arcade entry method uses the PREV/NEXT keys to scroll through a set of ASCII characters.

If a character was selected via PREV/NEXT but not entered via ENTER and some other key is pressed, the new key press overrides the Arcade entry.

The following character set is provided:

' ABCDEFGHIJKLMNOPQRSTUVWXYZ=#?*:%/,$'

The above set includes a space, uppercase A through Z, the equal sign, the pound sign, the question mark, the asterisk, the colon, the percent sign, the forward slash, the comma, and the dollar sign.

Direct ASCII Code Entry (SOI-260 only)

The Direct ASCII code entry method allows the user to press the EXP key followed by a decimal value from 32 through 254 to enter an ASCII code directly.

CHAPTER 5: SPECIAL OPERATIONS (P-A/D)

After pressing "MODE" (the mode key) on the SOI-120 or "F" (the function key) on the SOI-260, one of the menu items is labelled "Special". This item provides access to the Point-Access/Display (P-A/D) feature.

The P-A/D feature gives you access to all unrestricted programmable controller addresses. With this access, addresses may be displayed and/or modified. This feature is extremely useful in start-up or debugging sessions of programs or regular programmable controller operations.

CAUTION: The Point-Access/Display feature is a powerful tool. Its access should be restricted solely to authorized personnel. When using this feature, it is possible to change programmable controller data that may alter critical process control operations.

*Note: **After pressing "MODE" (SOI-120) or "F" (SOI-260), a Special Security Screen may be displayed (it has to be created with the SOI-SPS Programming Software). You must enter one of the three programmed security codes to continue to the Special Operations menu screen.***

Point-Access/Display on the SOI-120

Figure 5.1 shows the Point-Access/Display screens and the key presses linking them:

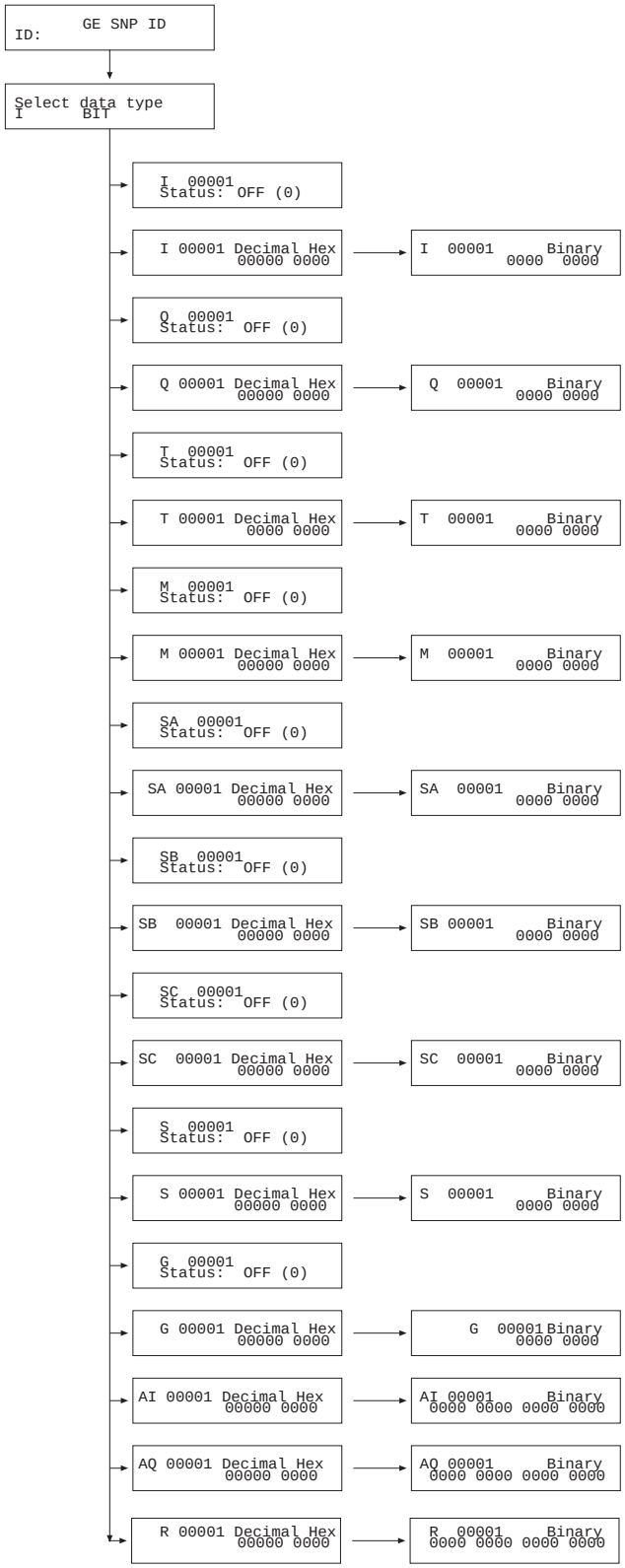


Figure 5.1 SOI-120 Point-Access/Display (P-A/D) screens

To display or modify programmable controller addresses from the SOI-120:

1. Press "MODE" (the mode key) on the SOI-120 keypad.
2. Select "Special" (item 3) from the menu that appears. If a Special Security Screen appears, enter any one of the programmed security codes.
3. Select "Bypass" (item 0), unless you want to Edit (item 1) the GE Fanuc network address.
4. Select "P-A/D" (item 1).
5. Press "NEXT" until the data type you want to display or modify appears (see Table 5.1), and then press "↵" (the enter key).
6. Enter the address you want to display or modify, and then press "↵" (the enter key). Alternatively, you can press "F1" and "F2" to decrement and increment the address shown.

   For 16-bit registers with read/write access, you can press "PREV" or "NEXT" to move you between the address and data fields so you can enter new data.
7. Press "↵" (the enter key) to load new data into the programmable controller. This new data is displayed immediately.

Note: At any point, pressing "MENU" returns you to the main menu.

Table 5.1 Supported OMRON registers.

Point-Access/Display on the SOI-260

Figure 5.2 shows the Point-Access/Display screens and the key presses linking them:

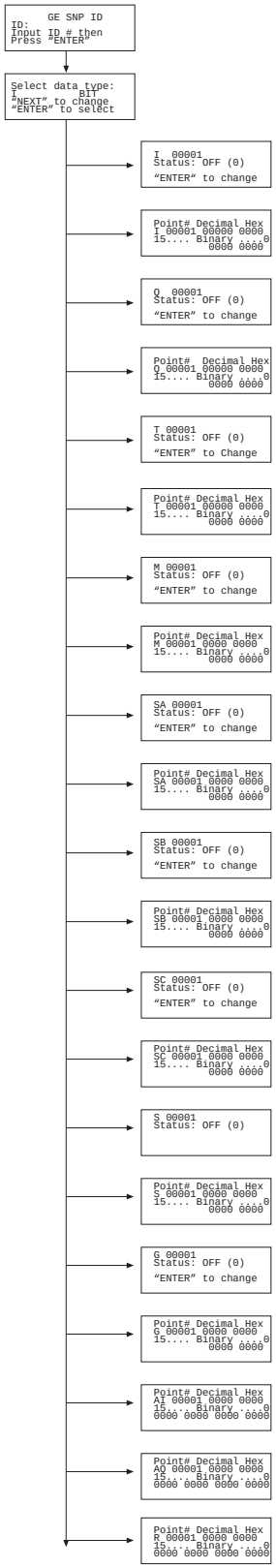


Figure 5.2 SOI-260 Point-Access/Display (P-A/D) screens

To display or modify programmable controller addresses from the SOI-260:

1. Press "F" (the function key) on the SOI-260 keypad.
2. Select "Special" (item 5) from the menu that appears. If a Special Security Screen appears, enter any one of the programmed security codes.
3. Select "Bypass" (press "N"), unless you want to Edit (press "Y") the GE Fanuc network address.
4. Press "1" to use the P-A/D function.
5. Press "PREV" or "NEXT" until the file type you want to display or modify appears (see Table 5.1), and press "↵" (the enter key).
6. Enter the address you want to display or modify, and then press "↵" (the enter key). Alternatively, you can press "N" or "Y" to decrement and increment the address shown.

   For 16-bit registers with read/write access, you can press "PREV" or "NEXT" to move you between the address and data fields so you can enter new data.
7. Press "↵" (the enter key) to load the new data into the programmable controller. The new data that was loaded into the programmable controller is immediately displayed.

Note: At any point, pressing "MAIN MENU" returns you to the main menu.

APPENDIX A: CONFIGURATION CHANGES

This appendix is intended to inform the user that the GE SNP time sync format differs from that in the core user's manual and uses the format indicated below. The time sync uses the format below for both the Time Sync Read and Time Sync Write.

Register Number	Example	Utilization by the SOI
1	R101	Year
2	R102	Month
3	R103	Day
4	R104	Hour
5	R105	Minutes
6	R106	Seconds

In the example either the time sync read or time sync write register is defined to be R101. From that register the year is read. The following consecutive registers (increasing by address) will read the Month, Day, Hour, Minutes and Seconds in that order.

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